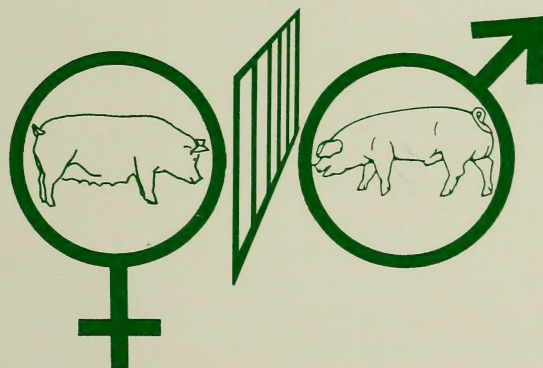


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The Alberta Swine Artificial Insemination Program Handbook



Copies of this publication may be obtained from:

Print Media Branch

Alberta Agriculture

7000 - 113 Street

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OR

Alberta Agriculture's district offices

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THE ALBERTA SWINE ARTIFICIAL INSEMINATION PROGRAM HANDBOOK

The Alberta Swine Artificial Insemination Centre is located north of Leduc, 1.6 km east of the Highway #2 overpass opposite the Edmonton International Airport. The centre was opened in June of 1978 and since that time has gained customers from across Canada for fresh boar semen. The capability to successfully freeze boar semen has made it possible for the centre to expand into international markets as well.

The major emphasis of the program has been to introduce artificial insemination as a practical swine breeding technique to pig producers located within the range permitted by reasonable shipping conditions for fresh liquid semen.

CONSIDER THE ADVANTAGES

Health Control

Artificial insemination is one of the safest ways of introducing new genetic material into swine herds. All boars kept for semen production at the A.I. Centre must be approved by Agriculture Canada Animal Health Veterinarians for freedom from brucellosis, leptospirosis, pseudorabies, transmissible gastroenteritis and tuberculosis. The Alberta Swine Artificial Insemination Program has the support of private and public swine health programs across Canada.

Choice of Performance Tested Boars

Proven sires of excellent quality are the building blocks of dynamic "improving" breeding herds that are keeping pace with market requirements. The boars used at the A.I. Centre are selected from among the highest scoring performance tested pigs found in pedigree herds of the five major breeds in Canada. They have proven to enhance production economy through improved carcass quality and growth rate.

Physical Soundness

Each boar must maintain excellent reproductive performance and continue to be physically sound to remain in service. Even toes and good cushion related to the correct posture of the feet and legs are essential for durable service. All boars must have a minimum of 14 (12 in colored breeds) evenly placed, well developed teats of which three pair must be located anterior of the navel. There must be no evidence of inverted nipples or any major physical fault.

Progeny Proofs

The genealogy of all boars is screened before purchase for evidence of the unusual incidence of ridglings, ruptures, splaylegs, porcine stress syndrome (PSS) and *atesia ani*. These traits continue to be monitored on a sire's progeny while the sire is in service. For example, once a boar enters artificial insemination service, a mating check for PSS is carried out. Proven boars are those boars which have remained in service for more than one year, have remained physically sound, are considered a low risk for PSS, have excellent fertility and are producing pigs of above average quality. Because proven boars are the most reliable choice for genetic improvement of the breeding herd, their semen is in the highest demand for production of replacement breeding stock.

Save Boar Power

Under proper management conditions, at least 75 per cent of sows should cycle by seven days post weaning. Use semen from the A.I. Centre to mate the majority of sows that come into normal heat between day four and seven. Permit the herd boars to service those unpredictable sows that come into heat late.

Artificial insemination can also be used to supplement boar power in commercial herds by providing those second and third services.

Reduced Stress

The stress factor of mating smaller or weaker sows to large boars is eliminated by using artificial insemination. Injuries during mating to both the stock and the herdsman can also be reduced.

Batch Farrow

Large commercial herds can now batch farrow without having to maintain a large boar battery. Consider reducing your boar battery to those young, eager, easy to handle boars. Utilize their eagerness early in the week to help you detect which sows are in normal heat five to seven days post weaning.

Greater Uniformity

Artificial insemination offers the services of the same boar over a greater cross-section of sows in the herd. The results should be more uniform breeding stock replacements and market pigs, which are important with today's large scale production and marketing pressures where uniform output counts.

Crossbreed to Reap the Benefits of Heterosis

Maximize the meat production efficiency of the herd by taking full advantage of the heterosis obtained by cross breeding. A herd of crossbred sows of similar genetic background can easily be maintained using artificial insemination. The goal is to generate a sow herd that responds in a predictable, uniform way to consistent management. A well planned and properly implemented mating plan can cut down on the number of stragglers in your system and reduce costs. Semen from a third breed or from a meat line of boars should be used to produce uniform market pigs that have outstanding production potential.

Semen Quality Control

Semen is checked by trained laboratory staff to assure that the necessary standards for sperm motility and morphology are met to assure satisfactory fertility up to four days post collection. This assumes the semen is cared for properly after leaving the laboratory. Semen that does not meet high quality standards is not offered for sale. Boars that repeatedly produce substandard semen are removed from service.

Cost Effective

The cost of purchasing fresh semen from the A.I. Centre is competitive with the cost of purchasing and keeping boars. Check with the A.I. Centre on current semen prices and delivery costs.

ORDERING SEMEN

Semen should be ordered to arrive when sows are expected to be approaching the fertile period or standing heat. Standing heat can be predicted to begin at four to seven days post weaning for at least 75 per cent of sows in a well managed breeding herd. Consequently, semen can be ordered well in advance to assure its timely arrival. Check the A.I. Centre's latest semen collection schedule to find out when the boars of your choice are to be collected. Semen collection schedules and semen prices are updated every three months in the publication *Boar Fax*. Once you have taken a swine artificial insemination short course given by staff from the A.I. Centre, your name should be on our mailing list and you should receive the *Boar Fax* and new boar catalogue pages regularly.

Wean four days in advance of the day that semen is to be drawn. The semen should be ordered to arrive by the fifth day after weaning, when most sows commence standing heat. Place your orders for semen at least 24 hours before the day the semen is to be collected. Frequently, the demand is heavy for semen from some boars and supplies of semen from individual boars is sold out days ahead. It is advisable to contact the A.I. Centre before weaning to make sure you will be able to obtain the semen you desire if special planned matings are to be made.

Orders for fresh semen can be placed 24 hours a day, seven days a week by phoning the Alberta Agriculture Swine Artificial Insemination Centre, Leduc, Alberta
Phone: (403) 986-1250.

Orders for semen placed after hours are recorded on tape. If you call after working hours (8:15 am - 4:30 Monday - Friday), please give your name, phone number,

the tattoo number(s) of the boar(s) from which you want semen, and

the number of sows you wish to mate to each boar. If you are ordering mixed semen, state the breed or breeds to be represented in the mixture and the number of tubes of semen required. Normally two tubes of semen are shipped for each sow that is to be inseminated. Also state when and how you would like the order shipped, and the destination for pick up. If there are questions about your order, a staff member will call you during normal working hours. If you require spirettes, these can be requested when you place your order for semen. It is a good idea to keep a spare package of four spirettes on hand.

Orders for frozen semen can often be filled from inventory on hand. However, if you have a special request, advance notice is necessary.

CARING FOR SEMEN

Open the package containing the semen when it arrives, check the contents to make sure that the order was correctly filled, and repack it until required. Each shipment is packed in an insulated box. The semen may be wrapped in a water jacket to protect it from cooling too rapidly during winter shipping. For each insemination, a mating record is supplied, leaving space to record information about each sow that is to be inseminated. The record already shows the tattoo number, breed of the boar and the date when the semen was processed. Complete the mating information in this record and keep it for future reference. The A.I. Centre will want to know the results of the inseminations you perform and will send you

a self-addressed litter information form to complete and return soon after the litter arrives.

The shelf-life of semen is at least four days if the semen is carefully stored. Fertility decreases after the third day, especially when the semen is stored in temperatures over 20°C. Check with the A.I. Centre before using semen later than 4 days post collection. Fertility of semen is adversely affected by sudden changes in temperature and by temperatures outside of the optimum storage range of 15 to 20°C. **Open the package daily and turn the semen tubes to resuspend the sperm cells in solution.**

HOW TO PROCEED

Timing of the Insemination

Correct timing of the insemination is of critical importance for success. Normal, healthy sows will exhibit standing heat four to seven days after they are separated from their piglets. In large pig units, several litters can be weaned at the same time (batch weaning), with the result that their mothers will be synchronized to come into heat together. Single sows separated from their piglets only by a partition often are delayed in coming into estrus. It is advisable to wean sows at least in pairs and to separate the sows from both the sight and sound of the piglets.

Conditions that disrupt uniform onset and expression of estrus or standing heat among sows are:

Poor Body Condition and Health — Sows that suffer large body weight and backfat losses during lactation often fail to cycle within 7 days of weaning. Heat may be

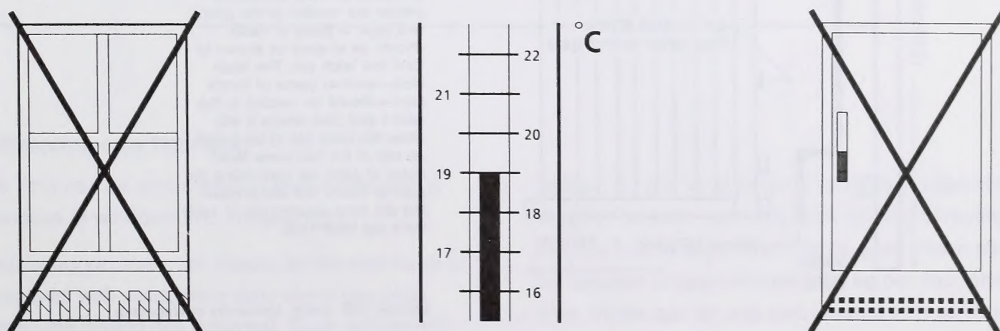


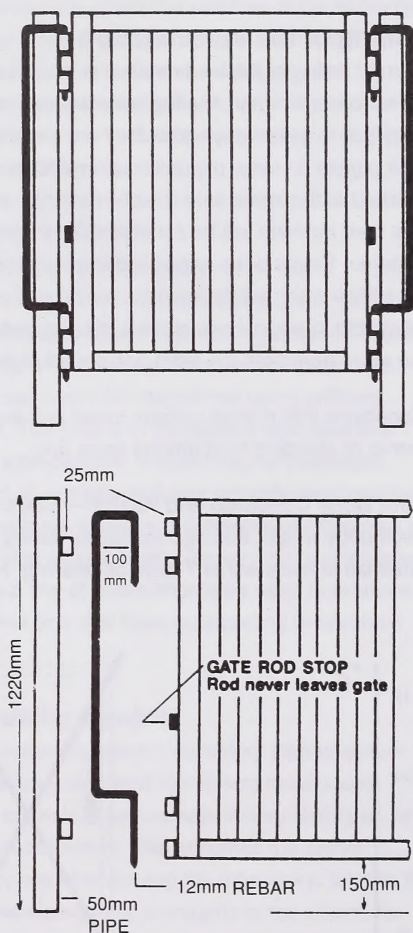
Figure 1. Do not store semen in a refrigerator or expose it to sunlight.

delayed well beyond this time. Sows that gain 35 kg during gestation should not lose more than a total of 20 kg during parturition and lactation. Lean sows cannot afford to lose any weight during lactation. Energy intake and weaning practices can be altered to enhance the health and body condition of the sow without adverse effects on the litter. Such factors include split weaning and more frequent feeding. Very fat sows, very thin sows and those under severe physical or social stress can be expected to come into estrus late.

The Mating Environment — Comfortable spacious quarters for sows should be provided following departure from the nursery.

1. If sows are grouped, no more than six sows of similar weight and size should be penned together. Sows of distinctly differing size and condition should be penned separately. Fighting often delays onset of heat in the weaker sows that are at the bottom of the pecking order.
2. Barn air temperatures should be regulated at 19 - 21°C. An adequate heat source for winter combined with air inlets sufficient to keep the barn air fresh, and exhaust systems to remove excess heat, moisture and stale air are required.
3. At least 14 hours of light is recommended in the breeding area to help stimulate the onset of normal

The gate's latch-hinge solves boar movement problems



No more searching for the latch pin and trying to thread it through a series of latch holes. No more being left in a boar's path after opening the gate to its pen. Levis' gate latch-hinge solves these problems. The latch stop in the center of the gate keeps the latch pin attached to the open gate. The pointed ends of the shaped-rebar pin make it easy to guide through the bottom two of the three latch holes in each set. With the latch-hinges on both sides, the gate can be opened from either side, always putting the gate between the producer and the exiting boar.

Levis' latch-hinge is easy to build and basically has three components. The six pieces of 1-inch pipe should form two sets of three latch holes. The two center hole pieces are welded to a corner pipe or a side panel's end pipe, and the remaining pieces are welded to the gate's end pipe. A piece of rebar should be shaped as shown to form the latch pin. The latch stop—another piece of 1-inch pipe—should be welded to the gate's end pipe where it will allow the latch pin to be pulled up out of the two lower latch holes of each set (permitting the gate to open), but will prevent the pin from slipping out of each set's top latch hole.

Source: D.G. Lewis, University of Nebraska

Figure 2. Gate design (two-way opening)

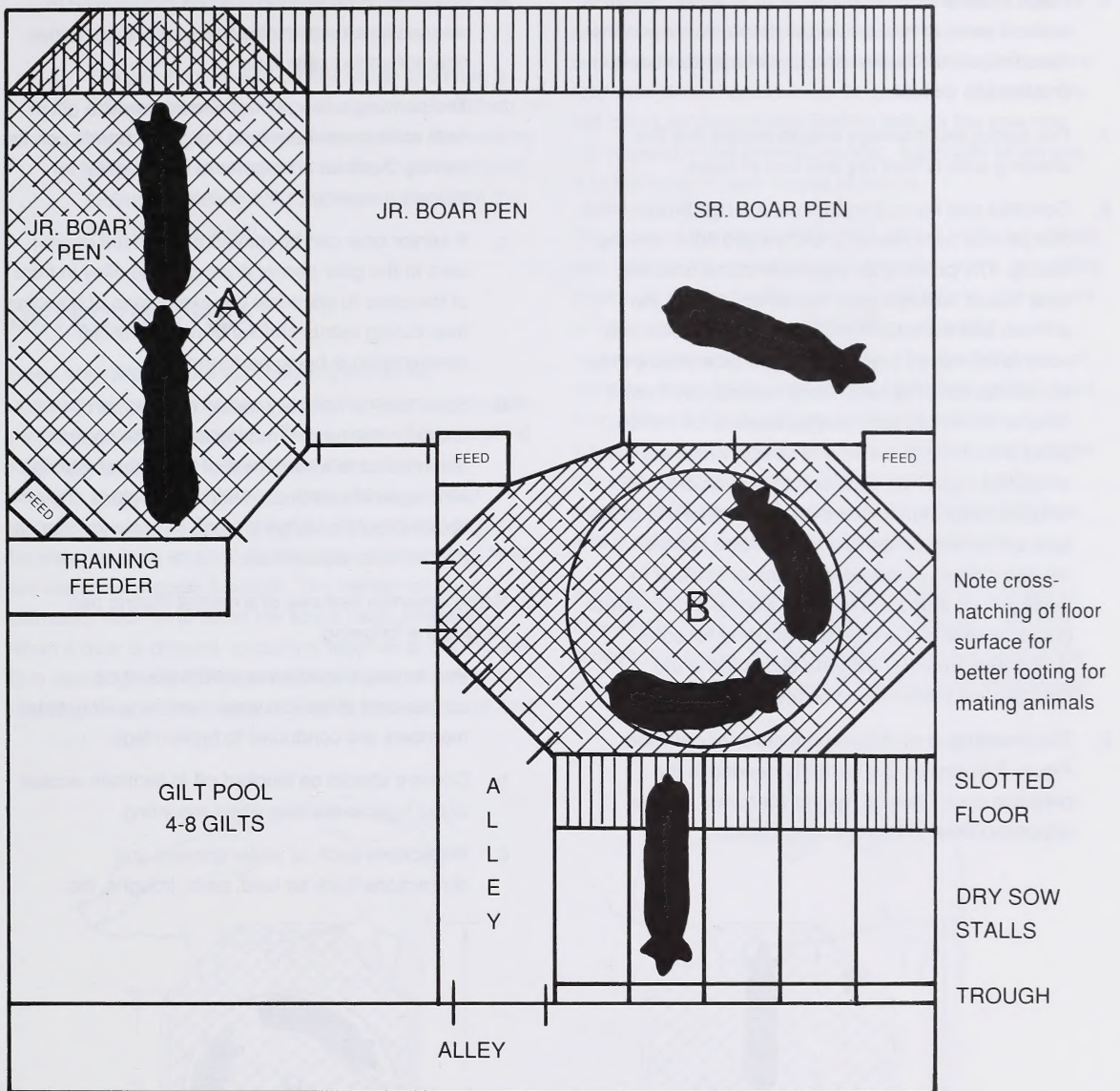


Figure 3. Breeding area floor plan

- estrus. This can be accomplished year round with a combination of windows and artificial light.
4. A sexually aggressive boar should be allowed head to head contact with sows twice daily every day post weaning until mating has occurred. Such activity will stimulate a more pronounced and earlier onset of estrus.
5. At least 3 - 3.5 kg of properly balanced ration should be supplied to each sow daily until the day of mating. For the first 14 days after mating, feed intake should be reduced to approximately 2.5 kg per day. After this time, intake can be adjusted upward to recondition the sow for the next lactation.

6. Fresh water should be available at all times. Nipple drinkers need to be adjusted to deliver water into the raised mouth of the sow at a rate of approximately one litre per minute.
 7. Pen layout and drainage should ensure that the sleeping area is kept dry and free of feces.
 8. Concrete pen floors should have a rough broom finish that permits easy cleaning and yet provides non-slip footing. The penning arrangement in the breeding area should facilitate safe movement of both the animals and the stockman. For example, sows may need to be moved together with the boar before they will exhibit standing heat. More importantly, if sows have to be moved from their quarters to be mated, gates should be of a size and design which are easy to operate (figure 2). Attention to convenience will help the herdsman to make more effective use of his time and energy. Freshly weaned sows can be housed indoors in individual crates or stalls or in small groups indoors. They can also be kept in larger groups outdoors. Comfortable housing for sows during post weaning will yield dividends in the reproductive performance of sows.
 9. The breeding area should be functionally efficient. Figure 3 illustrates the flexibility needed in the breeding area. Several mating scenarios can be accommodated in this breeding layout.
- a. Gilts should be penned in small groups next to weaned sows and in close proximity to an active boar for added stimulation.
 - b. The penning arrangement should permit a gilt in heat to be moved easily to the junior boar's pen for mating. Such an arrangement is also good for training a new boar.
 - c. A senior boar can be moved through the mating area to the gilts' pen or around to the alley in front of the sows to stimulate the expression of standing heat during estrus checks or when artificial insemination is being performed.
 - d. Sows can be naturally mated to the boar of choice in the neutral mating area. The neutral mating area is where most of the natural matings with experienced boars should take place. This space should be large enough to allow the mating pair to move about freely.
10. Some essential features of a neutral mating pen include the following.
 - a. Pen fences should have solid walls or be constructed of vertical steel members. Horizontal members are conducive to broken legs.
 - b. Corners should be blocked off to facilitate access of the boar to the sow when mounting.
 - c. Projections such as water drinkers and distractions such as feed, pails, troughs, etc.

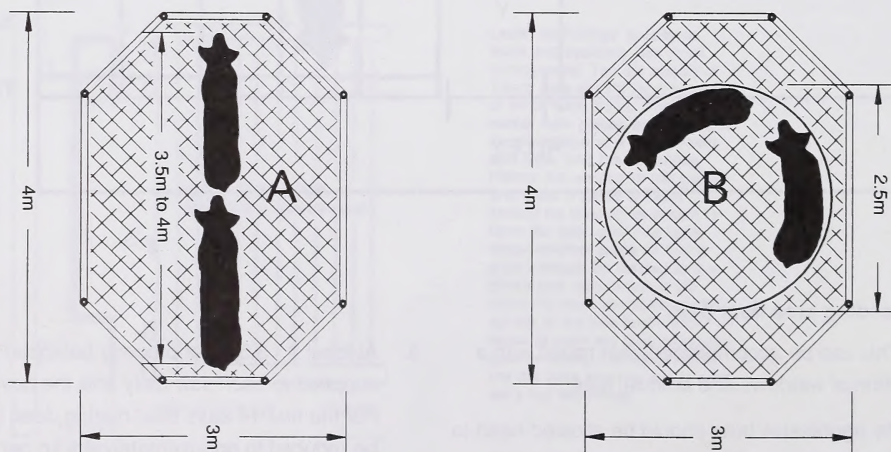


Figure 4. The minimum dimensions of the mating pens should be governed by the end-to-end measurements of the mating pair (A) and the diameter of an uninhibited turning circle for the pair (B).

should be removed from the pen to reduce the risk of injury to the mating animals.

- d. The pen floor should be dry, clean and have a uniform non-slip surface. A cross-hatch etching on the mating pen floor and the addition of a coating of clean sand and sawdust will provide excellent footing for mating animals, especially where the floor surface is wet.

DETECTING HEAT

Sows and gilts that are approaching estrus will aggressively seek out a boar or usually attempt to nuzzle, pester and mount penmates. These signs of approaching heat may be observed as early as three days post weaning in sows and nineteen days after a previous estrus in open gilts. The herdsman should begin to test for standing heat as soon as the signs of impending heat are observed (figures 5 and 6). The herdsman must ultimately attempt to sit on the sow's back, preferably when a boar is present, to confirm whether or not the sow is in standing heat. If the sow stands rigidly, she is in standing heat. If she refuses to stand, squeals, barks and

runs away, she is not in standing heat. Wait 8 - 12 hours and try again. Most sows that are approaching the heat period will exhibit a more pronounced and earlier positive response to the herdsman in the presence of a boar. **Do not** check for heat during feeding time as the sow may not respond in the desired manner, especially when she is in the early or later stages of estrus.

The signs of the onset of the heat period in the female pig also include the appearance of a swollen vulva, especially in gilts. At the beginning of estrus, the interior of the vulva is inflamed and often dry. The vulva will exhibit a clear mucous discharge within 12 hours after the beginning of standing heat. As the heat period advances – which lasts from 45 to 60 hours – the redness of the interior of the vulva will subside and the mucous discharge will become more viscous and opaque. The peak time of fertility is from 16 to 30 hours after the beginning of standing heat and is referred to as the vital time to inseminate.

If a boar is present when standing heat is first detected, inseminate 12 to 16 hours later and a second time 8 to sixteen hours after the first insemination. If a boar is not present when standing heat is first detected, inseminate

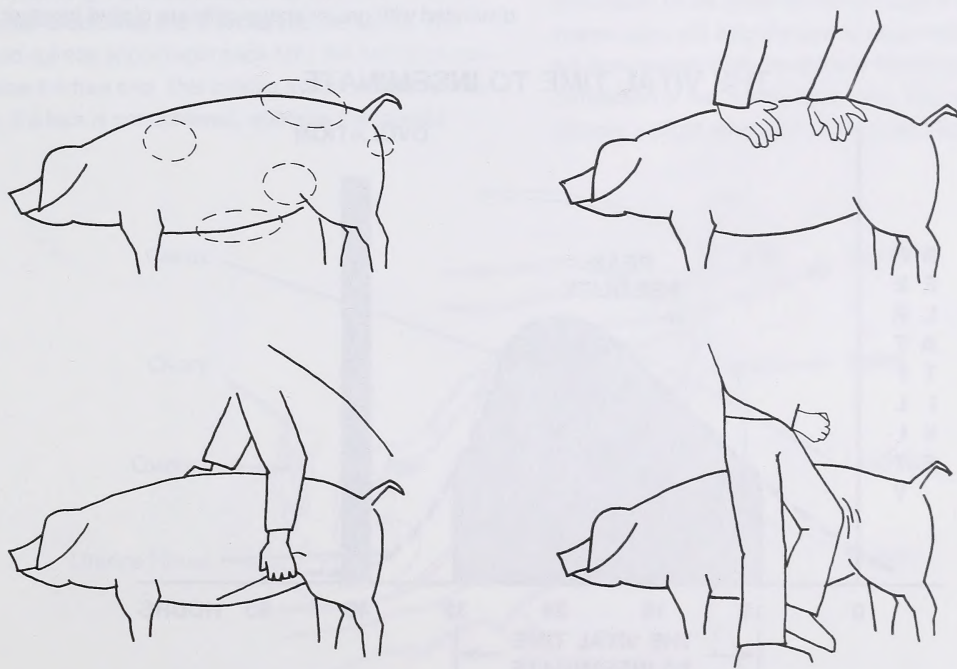


Figure 5. Areas that respond to stimulation during heat detection

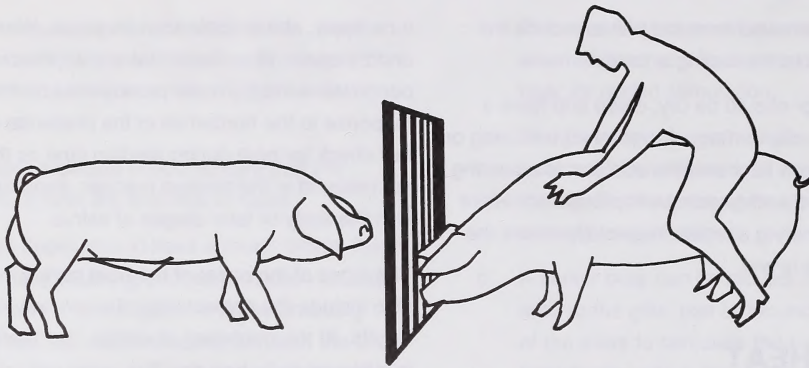


Figure 6. Riding the sow in the presence of a boar is the ultimate test for standing heat

8 to 12 hours later and a second time in another 8 to 12 hours.

When artificial insemination is being used to supplement natural service and a boar is used for the first mating, artificial insemination can be substituted for the boar at 8 to 16 hour intervals after natural service.

THE INSEMINATION TECHNIQUE

There are two tubes of semen for each sow that is to be inseminated. Inseminate the sow in surroundings that are familiar to her. Constraint in a crate is not recommended to induce sows to stand. The most satisfactory results occur when the sow stands voluntarily in the presence of a boar during the insemination.

Always inspect the semen tubes carefully before insemination. **Caution:** If the semen tube is severely distended with gas or sperm cells are clotted together and

THE VITAL TIME TO INSEMINATE

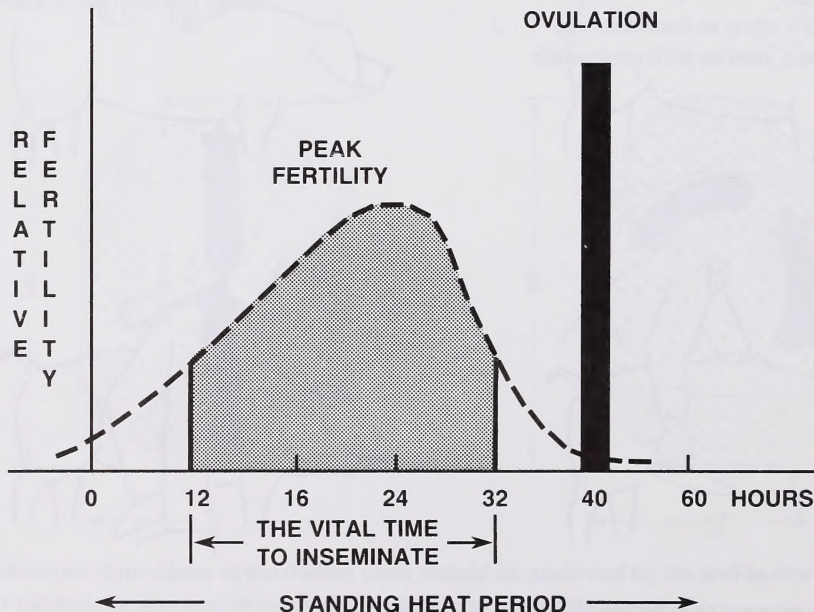


Figure 7. The vital time for insemination.

fail to disperse into solution, discard the semen because it has likely lost its fertilizing capacity. Such occurrences should be promptly reported to the A.I. Centre by a collect telephone call.

It is normal for sperm cells to settle out in the semen tube during storage. Prepare the semen by gently rotating the semen tube to resuspend the sperm cells. Remove the very tip of the nozzle of the semen tube with side cutters or a sharp knife. Place the tube of semen in a warm inner shirt pocket while the following preparations are undertaken.

Stimulate the sow to take up a mating stance. Wipe off any filth from the sows vulva. **Always use a clean spirette for each insemination.** If necessary, lightly lubricate the end of the insemination spirette with vaseline before inserting it carefully, but firmly forward and upward into the vagina. **Do not** direct the spirette downward or it may enter the urethra which is the duct leading from the bladder. If the spirette becomes lodged in the urethra, the sow will usually show discomfort and move away. Remove the spirette and start again.

Once correctly inserted, the spirette should be rotated **counter-clockwise** until it **locks** into the cervix. The locked spirette should spin back 1/2 - 3/4 turn once you release the free end. This locking action reduces semen loss. If a lock is not achieved, withdraw the spirette

slightly and try again until a lock is achieved (figures 8 - 13).

REMEMBER:

- Check for heat starting three days post weaning, and every 8 - 16 hours thereafter until the sow is off heat. Heat checks **must not** be spaced farther apart than 16 hours. If you are going to use stressed semen, semen that is older than 4 days or frozen semen, heat checks should be done every 8 - 12 hours.
- Do not inseminate when the animal first stands to pressure placed on its back.
- Delay 12 - 16 hours after first observing standing heat in the presence of a boar before performing the first insemination.
- Inseminate a second time 8 - 12 hours after the first insemination.

Couple the nozzle of the semen tube to the free end of the spirette and raise it vertically to allow the semen to flow into the sow. Stimulate the sow at the beginning of semen delivery, by very gently moving the spirette back and forth while keeping it locked into the cervix. Stimulation of the areas shown in figure 5 during the insemination will help the sow to respond positively. She will draw semen from the spirette following each contraction of her reproductive tract. You may also observe a slight relaxation of the sows stance and

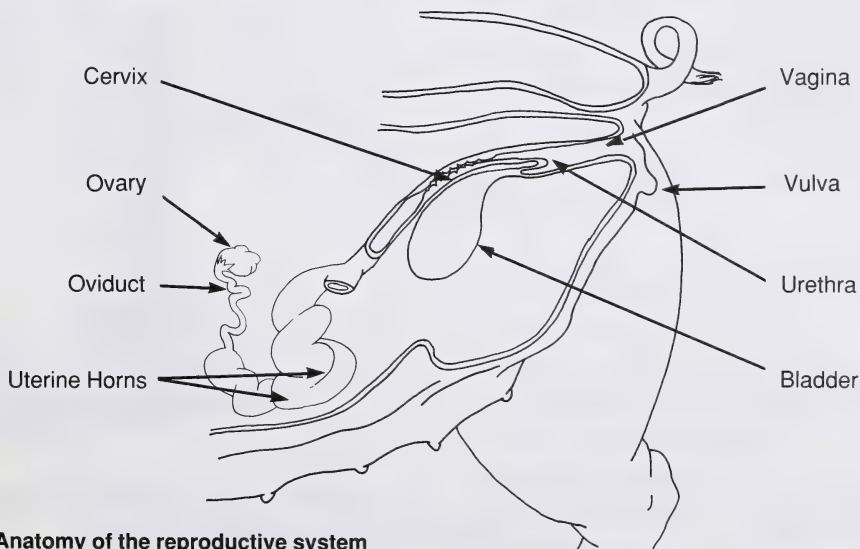


Figure 8. Anatomy of the reproductive system



Figure 9. Lubricate the spirette.



Figure 10. Insertion of the spirette



Figure 11. Ensure that the tip of the spirette follows the dorsal surface of the vagina.

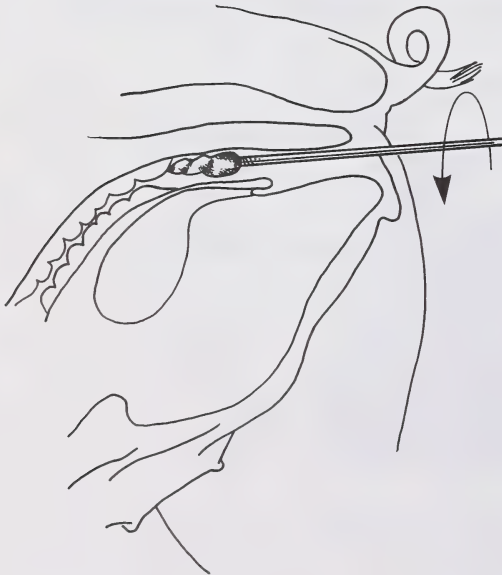


Figure 12. Turn the spirette anti-clockwise to lock in the cervix.

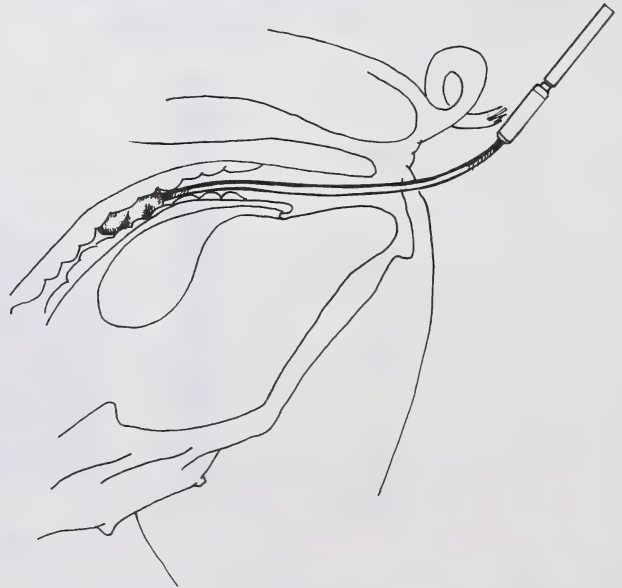


Figure 13. Connect the bottle of semen to the spirette and raise it up to start semen flow.



Figure 14. Flush used spirettes with hot tap water immediately after use.

contractions of the rectal area immediately before and during semen uptake. Gently apply pressure on the semen tube to initiate semen flow through the spirette but do not forcefully 'inject' the semen into the sow. Any excess volume forced into the sow will be discharged back out of the reproductive tract with each contraction of the cervix. Most inseminations take 5 - 10 minutes, some may take longer, patience is important. If semen runs back out of the sow during insemination, check to be sure the spirette is still locked into the cervix, then proceed more slowly. If possible, inseminate in the presence of an active boar. The smell, sight and sound of the boar enhances the sows ability to draw semen.

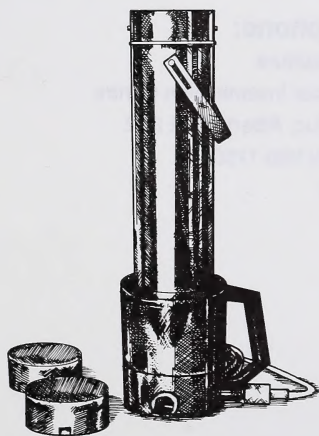


Figure 15. Rubber spirettes should be sterilized in boiling water.

CLEANING THE EQUIPMENT

Rinse spirettes immediately after use by flushing them with hot tap water, then soak the spirette in clean, warm, mild soapy water. Next, rinse spirette thoroughly with hot tap water (figure 14). Do not use disinfectants; they kill sperm cells. Water also kills sperm, so ensure that the equipment is dry before re-using it. After washing, shake off the excess water and hang the spirette, spiral upwards, in a warm place to dry. Once dry, the spirette should be stored in a clean plastic bag, ready for re-use. Do not use spirettes that have been lying around collecting dust. If you use rubber Melrose spirettes, they should be rinsed with tap water immediately after use and placed in boiling water to sterilize them (figure 15).

RESULTS

To improve your artificial insemination technique and efficiency, record how the insemination went and the results achieved. Note any major restlessness of the sow during insemination or backflow of semen. Record the amount of time that the sow remained in standing heat after the second insemination. If sows are routinely still in heat 24 hours after the last insemination, you are likely inseminating too soon.

Information Feedback is Important!

For litters born to semen originating from the A.I. Centre, you will receive a postage paid survey form (figure 16). Please complete it and return it to the A.I. Centre as soon as possible.

Customer comments and information about the results of artificial insemination matings help us to provide quality service in two ways:

1. Boars that are producing substandard progeny or have low fertility can be quickly identified and removed from service.
2. The A.I. Centre has trained staff to help if you are having trouble with artificial insemination. Please call them if you need assistance.

Give artificial insemination a chance in your pork production program. We are confident about its numerous advantages.

Swine Insemination Centre ----- Mating Survey

Date: 89/08/31

Process Date	Mating Record #	Boar Tattoo	Boar Code	Sow I.D.	Sow Code	Date Bred Yr/ Mo/ Da	Date Farrowed Yr/ Mo/ Da	Rtn'd (X)	Not Used	Total Born	Alive	Dead	Splay Legs	Shaker	Ridg- lings	Hernia	No Anus	Mummified
89/08/07	57938	ACA 16701X	01	202-OR	09	89/08/08		X										
89/08/07	57939	RITR 1174U	01	195-OR	09	89/08/08		X										
89/08/14	58163	ACA 16701X	01	207-OR	09	89/08/15	89/12/08			7	7							2
89/08/14	58164	RITR 1174U	01	283-OR	09	89/08/15	89/12/08			4	2	2						3
89/08/21	58291	RITR 1174U	01	600-OR	09	89/08/22	89/12/15			5	4	1						1
89/08/21	58292	DOUG 288X	01	286-OR	09	89/08/22	89/12/20			14	11	3						
89/08/28	58452	RITR 1174U	01	501-OR	09	89/08/29	89/12/22			13	12	1						
89/08/28	58453	DOUG 288X	01	210-OR	09	89/08/29	89/12/22			13	9	4						

Boar & Sow Codes 01 - Yorkshire, 02 - Landrace, 03 - Lacombe, 04 - Hampshire, 05 - Duroc, 09 - Crossbred

Please return this card when the information is complete

Comments:

Figure 16. Mating record survey form

COSTS

Details of the charges for semen and equipment are available from the Alberta Swine Artificial Insemination Centre. All shipments are sent prepaid, accounts are rendered monthly and payment for service is due within 30 days of billing. Insemination spirettes can be ordered when you order semen. Visit the A.I. Centre to discuss your breeding program needs and ask to view the sires in service while you are there.

FOR MORE INFORMATION ABOUT:

- Artificial insemination demonstrations
- Boar catalogues
- Collection schedules
- Progeny information on senior boars
- Scheduled artificial insemination short courses
- Frozen semen

Write or phone:

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